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THE PRACTICE SCHOOL COURSE IN GEOGRAPHY IN THE NORMAL SCHOOL, CHARLESTON, ILLINOIS*

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IN accordance with the leading teachers and scholars in the science of geography the field for our study is the "Earth in its Relation to Man." The study of life consequences (static geography) leads to that of earth causes (dynamic geography). The fundamental principle, then, is the causal notion. Facts are learned because they may be explained by physical surroundings. No one rule, however, can be the guide in the selection of geographic material for a course in the grades. Among the more important rules are the following:

First—The field of geography embraces all those facts that are dependent upon the physical environment for their explanation as well as the environment itself. This admits a wealth of material, many times more than any pupil can master in his five or six years of work. Hence,

Second—Only the facts more closely related to the physical surroundings, together with the more prominent elements of the environment, can be included. The foregoing limitations have to do primarily with the material.

Two other questions must be asked. (1) Is the fact or relation within the powers of the pupil to acquire? (2) Can it be reached directly or indirectly through his experience? Concerning many things this question must be answered with a negative in the lower grades, but with the affirmative in higher grades. Another consideration has weight. The program must be consulted. The four

* *This is the first of a series of these articles on this subject prepared by Mr. Hubbard, which are to appear in The Journal of Geography. It is presented because of its suggestiveness for teachers in elementary schools, and will be followed later by another portion of the same course showing how to teach the geography of the United States, by physical divisions, in the upper grammar grades. This second section will appear in November and December.*—Editor.

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rules above will admit much more purely geographic material than the pupil has time for. Consequently a final selection must come whereby the teacher presents to the pupil as much of the material selected under the foregoing rules as his time will permit, passing from the most important toward the least important in each section, subdivision, and topic.

SECTION I. TOPICS INTRODUCTORY TO GEOGRAPHY, WHICH SHOULD BE TAUGHT IN CONNECTION WITH OTHER SUBJECTS IN THE FIRST AND SECOND GRADES

1. Position or Relative Location.
   (a) front—back (c) up—down
   (b) right—left (d) near—far.
   Taught with reference to pupil—to another pupil or the teacher, and with reference to other objects in room and out. (Games, Manual Training, and Drawing.)
2. Direction. (a) Cardinal points. (b) Semi-cardinals.
   Begin with place where sun rises—east.
   Place arrow on floor pointing north with short cross-bar and letter the four ends. Arrow to be eighteen inches in length.
   Teach direction of objects in sight, with reference to pupil and with reference to other objects. (Games.)
3. Form—plane, sphere, hemisphere, cone. (Manual Training and Drawing.)
4. Color—common, simple colors: red, yellow, blue, green, brown, black, and white. (Literature, Reading, and Drawing.)
5. Distance, relative, and absolute, i. e., by measurement.
   (a) Horizontal—inch, foot, yard.
   (b) Vertical—inch, foot, yard.
   Compare heights of child, teacher, room, buildings, trees using the relative terms higher, twice as high, etc. (Number work, Drawing, and Manual Training.)
6. Time.
   (a) By clock, to minutes. (Number work.)
   (b) Day and night, together, make one day.
   Light and darkness.
   Sunshine and shadow.
   (c) Light because of sunshine, day because of light.
   (d) Darkness because of shadow, night because of darkness.

7. Life in different countries.
   (a) How children live in various countries.
   Sports and toys; school life. Gathered from stories and articles read or told to the pupils.
   1. Dutch child
   2. Indian
   3. Eskimo
   4. Chinese
   5. Brown Baby
   6. Gemila—of desert.
   (b) How people live.
   In families, towns, scattered over country.
   (c) Occupations—A few of vicinity mentioned and their simple relations to each other and to the pupil discussed.
   Farming, teaming, railroading, teaching, keeping store. (Nature Study and Literature). Frye El. Geog. pp. 35–50.
8. Plants and animals—some differences between them.
   Where plants live—on plains, hillsides, etc.
   Where animals live—on ground, in water, in ground, in air, etc.
   Some simple uses of plants and animals. Furnish fuel, food, building materials, etc.

SECTION II. HOME GEOGRAPHY. (NATURE STUDY, LITERATURE)

Actual experience, observation, is the best method of studying geography. Since one's observation begins with the things of his home region, his first and fundamental work is the study of his home geography. Since his experience cannot bring him into contact even with all of his home geography, he must use pictures and verbal descriptions to some extent to master that: and because no one locality furnishes all geographic concepts required for a full course in geography, many pictures, maps, descriptions, and, if possible, some excursions must be used to supplement the home geography. But the gate to the entire field is the geography of the home locality. Under each subdivision of the present section of the course, some geographic feature of the home environment is taken up, and coupled with it is a closely related feature which lies outside the home environment, but a conception of which is necessary for later work. The development of each concept must begin in something introduced by the pupil's experience.

The following subdivisions are given in the order in which it is expected to teach them. Some other order might be more serviceable in certain localities and yet be in keeping with the principles enunciated above.

XUM

Social Features.

1. Our daily needs; private.
   (a) Foods.
   Bread—bought from bakery.
   Flour from grocery, mill and farm.
   Milk—trace back to sources in like manner.
   Butter, vegetables, meat, fruits, may be treated in same way.
   Compare methods of supplying these things in town and in country.
   (b) Clothing.
   Cotton—source of material—farms.
   Made into cloth in mills, shipped to our stores and sold to us.
   (c) Fuel—work out if time permits.
   (d) Buildings; private—work out if time permits.

Ref.:—Long—Home Geog. pp. 87–107.

2. Our daily needs; public.
   In country—roads, bridges.
   In town—streets, abundant. Why? Plan, why?
   Need of grading, pavements, sidewalk, city lights, water, sewer, public buildings.
   Care of city—police, fire department, street cleaners.
   Railroads in town, station, freight house, cars, train, engine.
   So many needs to be supplied call for many occupations.

Ref.:—R. & H. Nat. Adv. Geog. pp. 42, 43. King—Geog. Reader, Bk. III., pp. 6–13.

3. Occupations—what people do.
   Some live on farms—some in towns and cities.
   On farms.
   Raising grain, broom-corn, wheat, hay.
   Cultivating and harvesting.
   Raising stock—horses, cattle, hogs, sheep.
   Raising fruit and vegetables.
   In town.
   Keeping store, bank, office.
   Teacher, minister, lawyer, doctor.
   Manufacturer.
   Railroader.

From these ideas of town develop the concept city. Discover differences between city, town, and country life. Work up interdependence

of city and country. Make it clear that men are working in many places and doing many things by which they supply many of our needs. Each is doing one kind of work. Some grow things to sell, others make things to sell, and others only buy and sell things, while a fourth class transport things from where they are raised or made to where they are made into other things or used.

Ref.:—Tarr and McM.—Vol. I, pp. 81–91. Long—Home Geog. pp. 127–142. Dodge—Reader in Phys. Geog. pp. 28–30.

4. Transportation.
   - Wagons on roads moved by horses.
   - Cars on railroads moved by engines.
     - Make those features touch the town and city life by discussing what each brings to and carries from the city.
   - Boats on water, sailboats and steamboats.
     - Bodies of water, lakes, river, ocean, canal.
   - Camels carry things in dry, warm countries. Why?
   - Llamas and donkeys in mountainous countries. Why?
   - Men carry things on their heads in some countries. Why?
     - Use pictures freely here.
   - Carried things are bought and sold.
   - Commerce is buying, selling, and carrying things.
     - Assisted.
       - (a) By mail.
         - Post-office, mail cars, mail bags.
       - (b) By telegraph.
         - Offices, wire, poles.
       - (c) By telephone.
         - Offices, wire, instruments.
   - Compare old and modern ways of sending messages.

Ref.:—Tarr and McM.—Vol. I, pp. 81–91. King—Geog. Reader Bk. I, pp. 1–7. Dodge—Reader in Phys. Geog. pp. 222–228. R. & H.—Nat. Adv. Geog. pp. 41, 42. Adams—El. Com. Geog. pp. 31–33. King—Geog. Reader, Bk. 4, pp. 173–196. Frye—Gram. Sch. Geog. pp. 59–60.

5. Mineral products.
   - (a) Stone quarry (quarries along the Embarras.)
     - Other sources and kinds of stone.
     - Uses of the stone.
   - (b) Salt, petroleum, gold, silver, iron, coal and clay should be mentioned.

Ref.:—R. & H.—Nat. El. Geog. pictures pp. 47, 48. Long—Home Geog. pp. 116–127. Redway—Manual of Geog. p. 16.

6. Plant products.
   (a) Vegetables—potatoes, beans, sweet potatoes.
   Conditions for growth; uses.
   (b) Fruits—apples, bananas, oranges.
   Conditions for growth; uses.
   (c) Grains—wheat, corn, rye, rice.
   Where they grow. Why? Uses.
   (d) Trees—oak, sugar maple, pine, nut trees.
   Where they grow. Why? Uses.
   (e) Other plants—sugar cane, broom-corn, cotton. Broom-corn emphasized.
   Where they grow. Why? Uses.

Ref.:—R. & H.—Nat. El. Geog. pp. 44–46. Long—Home Geog. pp. 87–103. Redway—Manual of Geog. p. 15.

7. Animal products.
   (a) Meat—animals used—kinds of meat.
   Where raised. Why?
   (b) Wool and hair—sources. Uses to animals.
   Uses to man.
   (c) Leather—sources—hides or skins, kinds, uses.
   (d) Furs—hide with hair or wool on, sources.
   Kinds of fur and animals; uses to man.

Ref.:—Long—Home Geog. pp. 110–114. Redway—Manual of Geog. pp. 15, 16.

Physical Features.

8. Soil.
   Where? How deep?
   Composition. Source. Compare with sand.
   What breaks up the rock? Discuss four or five factors.
   Similar processes for illustration.
   (a) Log or stump rotting—like rocks.
   (b) Nail or iron or bucket decaying—rusting.
   (c) See stones in an old cemetery.
   Rocks beneath soil—uses. Made into soil; used for buildings, etc.
   Kinds of soil—fertile, sterile: rich, poor.
   Uses of soil.
   Food for plants, holds water, place for roots to get hold.
   Different kinds, suitable for different kinds of plants.

9. Plains. Example prairie.
   Characteristics.
      Nearly level, broad, has soil covered with crops, grass, sometimes with forest.
   Uses.
      To live on, to cultivate.
10. Hills.
   Slopes, how steep. Covered with soil.
   Shapes and sizes, altitude, summit.
   Height much less than length of slope.
   Down and up hill.
   Water on slopes, runs off. Compare with plain. Makes channels.
   Large hills, mountains, range of mountains.
      Difference in temperature, top and bottom.
   Mountain climbing. Houses on hills.
   Uses of hills—people live on them, forests.
      Use pictures and sand model.
11. Valleys, usually contain stream, only a large channel.
   Compare with channels on hillside. Do not confuse with drainage basin.
   May be on a plain, sometimes between hills.
      (Examples: Embarras and others.)
   Describe form: length, width, depth, bottom, slopes like hill slopes, soil.
   Down the valley, up the valley.
   Varieties—gullies, gorges, canyons: some are much wider.
   Origin of valleys.
   Uses—drainage, farm, highways.
12. Divide or water parting.
   Source of water in valleys and on slopes.
      Draw out facts previously learned about clouds, rain, ice, snow.
   Water that falls at the summit of the hill flows some down one side, some down the other. Hence there are two slopes.
      Same on a higher portion of a plain.
      Line where the slopes meet at top is the divide.
      Examples—varieties in form.
   Slopes necessary for drainage.
13. Streams.
   Sources of the water—many.
      Showers, springs, ponds, lakes.

Location, among hills, in meadows.
Sizes, velocities—depend upon what?
Rills, brooks, rivers, branches, tributaries.
Associated features.
Bank, bluff, bed, bottom lands.
Up and down stream.
River at flood and in dry times. Use pictures.
Current.
Sediments carried.
Obstructions to progress of water.
Lakes, ponds, boulders.
Obstructions to boats.
Rapids and falls, dams, ice.
Uses of streams.
Drain the land, place for boats.
City water, ice, power for mills.

14. Lakes, ponds.
Compare with streams.
Places where streams nearly stop. Why?
Inlet, outlet, head and foot of lake.
Depth, width, length.
Uses—boating, city water, ice, fishing.
Ocean, characteristics.
Deep, broad, salty, waves.
Relation to rivers.
Uses, for ships, fishing.

15. Shore forms—shore lines, what?
Land forms along shore.
Cape, peninsula, island, isthmus.
Lighthouses on capes and headlands.
Cliffs, beach, shore; uses.
Water forms along shore.
Bay, gulf, strait.
Bays used for harbors.
Often modified by men; deepened; breakwaters, wharves.
Pictures must be used extensively but miniatures of many of these things can be found.

The excursion and the sand table should be used as well as questions to draw out what the pupil has experienced in these topics, 8–15.

Ref.:—Redway—Teacher's Manual of Geog. pp. 10–15. Dodge—Reader in Phys. Geog. pp. 198–205, 81–99. King—Geog. Reader,

Bk. I, pp. 87–103, 117–150. Long—Home Geog. pp. 31–40, 50–71. Tarr and McM.—Vol. I, pp. 1–70. King—"The Soil." Frye—Brooks and Brook Basins. Kingsley—Madam How and Lady Why, ch. IV. f. R. & H.—Nat. El. Geog. pp. 21, 24–30. Frye—El. Geog. pp. 2–4, 6–16. Miller—Brook Book pp. 231–237. Frye—Child and Nature.

16. Map work.

How many would like to make a drawing to show some friend where things are in our schoolroom?

Map of schoolroom, to scale.

Explain need of scale, and use of it.

First make a large map one inch to a foot. Draw it on a low table. Let pupils stand on south side of table.

Draw lines on the paper to correspond with the walls.

Put in by characters some of the objects of the room.

Carefully remove paper to a north wall, with line for north side of room at top. Have pupils compare map with room.

Explain relations of direction.

Have pupils draw map of room with scale ¼ in. = 1 foot.

Then map of yard or building on new scale. Maps of localities visited, and of the town, with its public buildings should follow.

Insist that the characters only *represent* the things, and make a legend and scale to go with each map. Show pictures of bird's-eye views of regions of land and water, and of cities, and beside the pictures show map of exactly same region. Compare and identify corresponding parts.

Map-drawing is a means to an end. The purpose of map-drawing is to enable the pupil to interpret map language, and to sketch his ideas of position, shape, and relative sizes of things on paper.

Ref.:—Tarr and McM.—Vol. I., pp. 102–107. R. & H.—Nat. El. Geog. p. 20. Frye—El. Geog. pp. 18, 19. Long—Home Geog. pp. 23–29, 76–79. King—Geog. Reader Bk. I, pp. 31–43, 51, 52.

17. Government.

Voting—election day, what for?

City officers, need of?

Board of education to care for schools.

Aldermen and mayor to make laws for town, and to enforce them.

Policemen to guard our property.

Other officers children may know.

President, senator, representatives.

Judges, county clerk.

Need of state officers in Illinois.
Need of U. S. government.

Ref:—Tarr and McM.—Vol. I., pp. 92–100.

18. Air—Climate.

Observations for short periods of two weeks during three or four of the months of the school year, not only to correlate the several meteorologic elements but to note seasonal changes of the weather. It is intended that the observational and experimental work shall proceed together, and that both shall be carried on at intervals alternating with other work of this section.

I. *Observations to cover.*

(a) Winds.
Direction—north, east, south and west. Most common direction.
Velocity—calm, light, moderate, high and gale.

(b) Sunshine—clear, fair, cloudy; clouds thick, thin.
Movement of clouds.
Count up number of each kind of days during each period.
Classify as clear, fair, cloudy.

(c) Precipitation.
Kinds—snow, rain, hail, sleet.
Correlate wind direction with precipitation.
How rain falls—gentle or heavy.
Number of stormy days in each period.
Number of showers in each period.
Discuss special storms and unseasonable weather.

(d) Temperature.
(a) Observe temperature as cold, cool, warm, very warm.
(b) As related to formation of dew, frost, ice.
(c) Effects of freezing water, breaks vessel and rocks.
(d) Time of day warmest. Note position of sun at warmest part of day.
(e) Correlate wind direction with temperature.
(f) Discuss seasons; relation to temperature.

II. *Experiments.*

Experiments to show fact of air.
Immerse upright, uncorked bottle in water. Air gurgles out as water goes in.

Uses of air.

Experiment to show movement of air and to determine cause for it.

In doorway between a warm and a cold room, with lighted match or smoking punk notice opposite currents at top and bottom of door. Note optical effects of heated air rising over stove or lamp. Cool heavy air comes in under warm lighter air and lifts the latter up. If air moves upward in one place it must come down in another. Horizontal streams of air connect the ascending and descending columns.

Air in motion laterally is wind.

Winds caused by difference in temperature of air in adjacent places. Expand the idea to take in the rising air and smoke of bonfire, then of warm regions on earth.

Uses of winds.

Sails, windmills.

Moisture is part of air and consequently is part of the wind.

Source of this moisture of the air.

Evaporation.

Boiling kettle of water, drying of clothes. Test it.

Water becomes water vapor or gas and cannot be seen.

Water evaporates from muddy roads and fields and from rivers, lakes, and ocean.

Sum up the forms of water.

Ice, water, water vapor, and steam.

Condensation—why?

"Sweating" of cold pitcher. What? Why?

Moisture of breath on mirror or on the window.

Breath on a cold morning, little cloud.

Fog and cloud are condensed water vapor.

Moist warmed air is made to rise to heights where it is cold and the water vapor is cooled and condensed forming clouds and rain drops.

Summer showers.

If study of surface has gone far enough trace the drop of water from the ocean to clouds, rain, brook, river, and back to the ocean. If not, postpone to suitable time.

Ref.:—Tarr and McM.—Vol. I, pp. 70–80. R. & H.—Nat. El. Geog. pp. 38, 39. Frye—El. Geog. pp. 21, 31–33. Long—Home Geog. pp. 40–49. King—Geog. Reader Bk. I, pp. 105–115. Dodge—Reader in Phys. Geog. pp. 171–178, 185–194.

(*To be continued.*)

THE CORRELATION OF GEOGRAPHY AND HISTORY

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THE title may be taken to indicate in a general way the beliefs that a definite relation exists between the subject-matter of geography and history and that this relation is not sufficiently realized in our teaching of them. In order to make any definite suggestions toward improvement in the teaching it will be needful first to define their mutual relations.

If one compares the continents of the Northern with those of the Southern hemisphere in world significance, the contrasts, in both present and past times, seem marked. In the northern continents, almost without exceptions, have the virile races of the world—even civilization itself—developed. "Westward the course of empire takes its way"—in the Northern world only. These continents have helped one another to develop and now are reaching out to the southern continents. The latter have been the ones subject to missionary effort —physically, intellectually, and religiously. To make the observation is to seek the cause. The northern continents are those of irregular coastlines, offering good harbors and bays, hence inviting to commerce and mutual relationship; of great range of climate with prevailing habitable conditions; of diversity and abundance of plant and animal life. Physical conditions have stimulated and rewarded toil and growth; environment has made for civilization.

The one most apparent exception, Egypt, tests yet conforms to our rule. One of the earliest civilizations for the very reason that its physical surroundings were more favorable even than those in the northern continents; with water and prepared soil annually furnished by the river; with warmth of climate suitable for all manner of produce, what wonder that leisure was furnished, after necessities were provided, wherein to cultivate the higher things in life? Religion, caste, art, science, learning flourished. Well might they worship the Nile!

Greece, renowned for stalwart, liberty-loving people, for commerce, literature and art, was a peninsula centrally located in the Mediterranean world, a drowned region "up to its knees in water" with ridges standing boldly out in peninsulas and islands, its lowlands giving place to bays and straits. Those ridges, as any map of ancient Greece will show, formed barriers separating independent tribes. Beauty of

scenery, climate, and ease of communication with all parts of the known world invited her later distinction.

England furnishes another illustration in point. Situated at the center of the land hemisphere she can reach more readily than any other country to all parts of the world. Yet in her separation from the continent of Europe she has been free to go her own way and work out her own destiny. Insulated, yet central, she could seek out or keep out the world. Her nearest neighbors, the low plains of Europe, fertile and teeming with population, invited commerce and the exchange of manufactured for raw goods; her embayed coastline first gave access to pirate rovers, then encouraged their descendants to commerce, exploration, colonization. Geologically a part of Europe, fertile for plants, wealthy in mines, the invaders came for agriculture and remained later for manufactures and commerce. To-day Great Britain is an empire whose "drumbeat follows the sun"; the Bank of England has long been the standard for the world; and her commerce and manufactures are as widely known.

The German Confederation, Austria-Hungary, Italy, Spain,—many other cases might be cited further to demonstrate the point. Yet illustrations seem superfluous when we consider the real meaning of our problem. Geography is, simply, the story of the earth as the home of man; history, the story of man in his home, the earth. The former asks us to learn how people live to-day, all over this earth; the latter, how people have lived, in one locality or another, and how they came to live as they do to-day. The one is extended in space; the other, in time. Man depends to-day, fundamentally, upon the soil, although not every man need be a farmer. A man's occupation—a nation's occupation—depends now on place. It must always have done so. Man's problem in any age is, how to get a living, and, through perfecting the ways of doing that, find leisure to approach his ideals. With the latter grows civilization.

Enough has been said to indicate the belief that environment is a definite factor in determining the development of a man or of a nation of men. This does not mean, however, that it absolutely controls or that its influence is calculable. History is not, nor can it ever be, prophecy. Heredity and human reaction cannot be neglected. Indians and English had the same environment in our own land; how different their use of it!

Nor does the environment restrict growth in any narrow sense. By truer conformity to Nature's laws man may rise superior to his mere surroundings. Irrigation on an immense scale in our arid West

shows our real dependence on, yet superiority to, environment. Without water there cannot be agriculture; yet where the land is not near rivers water is being brought to it. The telephone and the electric car are transforming the life in our country portions of New England: such works as those of the United States Steel Corporation transform Nature through use of her own laws. Only through such use of Nature do we develop ourselves most highly.

Particularly evident is this relation of history and geography in the United States. Hence it is relatively easy and particularly beneficial to illumine our study of its geography by historical side-lights, and explain its history by relation to physical surroundings. Each study will then re-enforce the other. Let us see how history will illumine the geography.

From the purely geographical standpoint we think of the Appalachians as "old mountains," well rounded, wooded to their summits. We find them to consist of the Allegheny Ridges and Plateaus, Great Valley, and Blue Ridge; we notice also their geological structure and origin and the peculiar forms resulting from their erosion, whereby they have been for us storehouses of coal and iron. Why not see them also as fort and barrier for the early English colonists? If they furnished protection till the settlers grew strong, they also hemmed them in when ready for westward expansion. Any relief, drainage, or railroad map will indicate the lines by which this section could be traversed. These four were not only used in war and migration but they had been already marked out by buffaloes or Indians. The Iroquois Trail, early used as an Indian war-path, became as well the war-path of armies in the French and Indian War; and in the Revolution the Mohawk Valley was a contested way. The Erie Canal on this same natural route helped make New York City. To-day the road, canal, and parallel lines of railroad, crowded side by side in the narrower parts of this pass, show its abundant usefulness.

Farther south Nemacolin's Path became the road of Washington and Braddock, later a settlers' path to the new West, now the roadbed of the Pennsylvania railroad. The Baltimore and Ohio railroad now uses the Kittanning Trail—a pathway in Pontiac's War, the National Road of struggle and party division in our early constitutional days. The Wilderness Road, leading to the settlement of Boone and other pioneers, was much traveled and that long before its use in the Civil War.

In later days these same mountains have been robbed of coal and iron; they have witnessed the coming of the United States Steel

Corporation; and to-day their wealth—in bridges, rails, and locomotives—is found all over the world.

If our geographical study of the Appalachians can include such glimpses into the dealings of surface-scratching man, and his use of them, will not the vision strengthen the picture? Will it not pay, from the mere geographical standpoint? Is there anything in this which may not, in spirit, be applied as well to Prairies, Rockies, or Mississippi?

Attention to geographical factors as influencing history may, on the other hand, result in a new classification of the periods of our history, a better economic understanding of the present, and more intelligent outlook upon the future.*

From 1600 to 1700, the period of colonization, the contest was between English, French, and Spanish settlers,—each in his own way adjusting himself to an environment largely incompatible with his previous life. The Spanish had, indeed, their pick in the continent. Carried naturally by winds and currents to that portion most like the homeland in climate and resources, they at once set about either gaining from their new territory wealth in the form of gold, or Christianizing the natives—not so much for the good of the latter as to extend their faith. They showed themselves conquerors and rulers.

Their treatment of the natives is in striking contrast with that of the French. These, as traders, possessed themselves of the waterways and of the interior, established forts and trading posts. To the Indian they said; "Here are powder and bullets to help you get more peltries; bring them to us and we will pay you well; hunt, if you choose, under our very forts." The *Coureurs des bois* adopted Indian customs and lived almost Indian lives. Small wonder that the Indians were their allies!

The Englishman's frontier was as much out of harmony with Indian life as the Frenchman's was in sympathy. He cleared, ploughed, planted the land; his settlements were compact, aggressive. He adjusted himself to pioneer conditions, fought the Indians in their own way, steadily resisting their mode of life. Very naturally the Indians hated the English—an advantage of which the French did not hesitate to avail themselves. Among all the tribes the Five Nations alone were openly the friends of the English, and that because the French had early joined their foes and fought against them.

To contrast, then, the claims of these rival nations, the Spanish had the claim richest in mineral and plant wealth; the French that of

* "The Significance of the Frontier in American History," by Frederick J. Turner, in Annual Report of the American Historical Association for 1893, pp. 199–227.

greatest extent and resources; the English that most compact and permanent. Their mode of settlement meant a conquest and reclamation of the land with westward progress as fast as development permitted. By 1700 the frontier line coincided closely with the "fall line," extending from New York through the present Trenton, Philadelphia, Baltimore, Washington, Richmond, Raleigh and Augusta. Now marked by important cities, it had then long been a line of Indian villages, where falls interrupted the use of the rivers, navigable up to this point.

1700 to 1783 witnessed the struggle for possession, in two distinct phases. By 1750 the frontier had been pushed westward as far as the Alleghenies. In nearly all the colonies the western portions or the "backwoods" were not only less developed than the older eastern, but a marked difference in spirit had begun to be evident. The "backwoodsman"—self-reliant, independent, liberty-loving—was a marked contrast to the more cultivated citizen of the coastal region. An aristocratic feeling might develop in the "East" but pure democracy alone could exist on the frontier. During this time there were many Indian wars, and preparation was being made for the final struggle—the French and Indian War. It was a period of contest with the uncivilized occupants of the soil; it was a contest for life itself and for possession. (See Map I, page 392.)

From 1750 till 1783 the struggle became one for freedom. By the French and Indian War the French barriers were removed and expansion westward was, to the Mississippi, unrestricted save by Nature. Notwithstanding the stress of the time the frontier was pushed west of the Alleghenies as far as the limestone belt extended. (Compare the population map for 1790, Eleventh Census, with the United States geological map, 14th Annual Report, U. S. G. S.) In two places small islands of population show the beginnings of settlement in the Southwest Territory; in the blue-grass regions of Kentucky and in Tennessee, Boone and others had found the limestone again outcropping. (See Map I, page 392.)

During the same period occurred also the Revolution from England. Expressive of the self-reliant spirit of the frontier, it was also a strong lesson in mutual dependence and consolidation which alone could make a nation.

* The next period—from 1783 to 1815—was one of Federal union and consolidation. It witnessed the pushing of settlement almost

* It is suggested that in reading the following paragraphs reference be made to the series of maps in Part I. of the Report on Population of the United States, Eleventh Census. These show the advance of population decennially since 1790.

MAP II. *THE FRONTIER OF 1820*

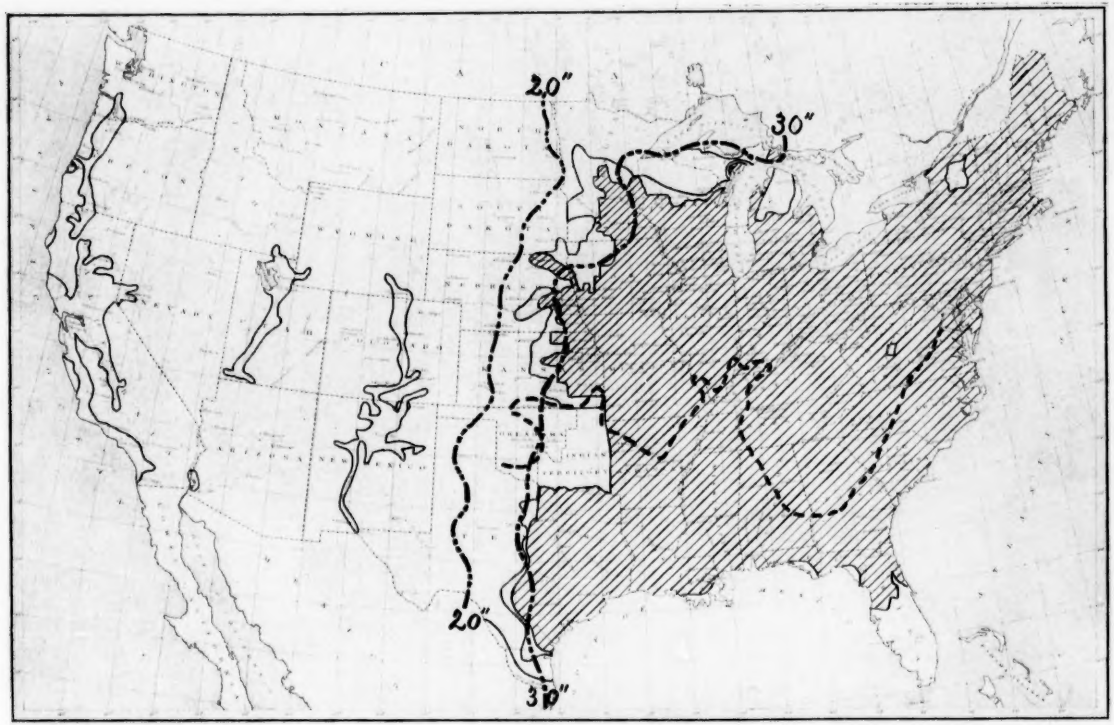
The shading is arranged as in Map I. (page 302.) Notice the lines of advance; the thickly settled regions; the "islands" of unsettled areas left behind where conditions were unfavorable; and the settled "islands" in advance in the particularly favorable regions.

to the Mississippi; Northwest and Southwest Territories developed. Still, the most decided advance was in marking out the lines for later rapid extension. The first six years were mainly a struggle for government—the "Critical Period." From 1789 to 1801 form was given to the new government. Yet in the very beginning of our institutions parties began to crystallize, and along the former lines; aristocratic and frontier spirits were represented in Washington's cabinet, in all elections after the first, in foreign relations, in questions of internal improvements. Under Federalist supremacy a certain stamp was given our government which has influenced our whole history. (See Map II, page 409.)

Attention was absorbed from 1801 to 1815 in defending frontier and commercial rights and in uniting the country. It was essentially a time for showing to the world a united country, ready to be considered as a nation. It was a time, as well, of steady though quiet growth in preparation for the succeeding burst of progress.

The period from 1815 to 1850 may well be termed one of Westward Extension. The frontier pushed westward to eastern Kansas, Nebraska and Indian Territory, and nearly all the included land was occupied. Thirteen new States were added to the Union. It seems most natural to think of the latter part of this time as one dominated by the slavery contest; and yet the development of that question was in large part due to this same westward extension. The Northwest and Southwest were differentiated in both climate and soil—the former being largely glaciated, the latter not. The one was poorly adapted for slavery; the other well; the one was opposite the non-slaveholding North, the other adjacent to the slaveholding South. Slavery was from the first an economic question; not until late in the contest were its ethical aspects prominent. It is significant, too, that the question became bitter only when it became a frontier issue; the same self-reliant, independent spirit which showed in the Whiskey and Shay's Rebellions, helped give the bitterness to the contest. Only when the available slaveholding frontier was becoming exhausted was the issue forced. During this same time the character of those chosen to the presidency changed significantly; previously they had been statesmen, like Washington and Adams; since then they have been largely popular heroes, as Jackson, Harrison and Lincoln.

Turning from these more prominent characteristics of the period we shall find that the more quiet phases show better the real growing strength of the time, and the resources which made it possible to endure the struggle and yet keep our place as a nation. It was a time of development of agriculture and of economic differentiation. Much



MAP III. *THE FRONTIERS OF 1860 AND 1870*

The shaded area includes the places whose population was in 1860 over two per square mile. The full line shows the frontier for 1870. Notice the slight advance and the relation to the lines of twenty inches and thirty inches annual rainfall; when aridity checked progress immigration leaped over to the favorable regions of Colorado, Utah, and California. The dotted line is the northern boundary of cultivation of cotton, rice, sugar, etc. Compare this with maps in any United States History showing the slave and free States or the loyal, seceding, and doubtful boundary States. Differences in soil and climate caused the differentiation between the Northwest and Southwest.

of the labor-saving agricultural machinery was put in use and agriculture began to appear a prominent industry.

The period from 1850 to 1880, from an industrial standpoint, was a time of slow laying of the foundations for another forward leap. It was characterized by the War Between the States and the restoration of economic unity. The first five years were given to the struggle and the second to the reconstruction necessarily following. During this time the frontier moved forward slowly. This was due, in part, to the fact that the arid frontier was reached. The frontier lines of 1860 and 1870 followed closely the line of thirty inches of annual rainfall, excepting Indian reservations; in no place did they approach that of twenty inches. (See Map III. page 411.)

The last ten years of this period may well be called the time of agricultural dominance, although agriculture had been assuming this importance since 1840. Exports of raw material, other than cotton, became extremely important and were an agricultural factor in the life of European nations. At the same time manufacturing made rapid strides, especially in the East; it became important to our own country but had not assumed world importance.

It is interesting to notice further that the arid west could not restrict the westward growth of population. Three islands of new settlements appear on the population map for 1870, where mining or agriculture offered inducements. Colorado, Utah and California show nuclei for future development.

1880–1898. This period is one of development rather than spreading of population. It is true that growth around the three nuclei of settlement mentioned above was so extensive that the superintendent of the census of 1890 declared the frontier practically exhausted, so that our task became one of developing and filling in the arid and otherwise undeveloped regions; yet the preponderating activity of the period seems to have been the development of manufactures. For home use mainly they became the dominant industry of our country. With the approaching exhaustion of the public lands there was a marked growth of socialistic ideas and the formation of trusts and labor unions. Hitherto men dissatisfied with their work could emigrate to fertile western lands almost given to them; that possibility now became much more restricted. Trusts and labor unions seem, in a way, a result of this dissatisfaction when the former alternative was removed.

In 1898 there seems to have begun a new period, in which we are now living. Industrially, our trade in manufactured articles in the world market has assumed international importance. To the older

manufacturing and commercial nations we now supply manufactured goods as well as raw materials.

At the same time our nation assumed among the nations of the world a new importance and entered upon a course of action perhaps uncontemplated by our constitution—the career of expansion and colonial possession. Prowess in warfare led to new respect among nations. Possibly the extinction of the frontier has led to a bursting of our bounds as a new expression of the same activity.

To summarize the effect of our geographical illumination of history, one needs but recall that we have found a westward movement of successive frontiers,—those of the pioneer, ranchman, farmer, manufacturer,—giving us the key to the dominant questions of each period, to its political theories and parties, and to its economic questions. We have seen that any one physiographic region has felt the influence of these successive waves of industry until it has finally settled down, or is now settling down, to the industry to which it is best adapted. An interesting illustration of recent changes of this kind is seen in the farming regions of the Middle West. Ten years ago the farmers there depended upon immense crops of wheat or some other staple; the harvests were followed by immediate sales at whatever prices were offered. To-day diverse crops are produced. Large barns offer opportunity for storage to await favorable markets or use for fodder, which will offer double profit to the farmer when beef is in demand. (See the *World's Work*, Feb., 1903.)

The results upon American character have been marked. One hundred years ago the lank, drawling "Yankee" was called typical; now the general complaint is "Americanitis." We fear that we live at too great tension. The magnitude with which operations have been conducted in the West has led to the day of large things. Trusts are the natural results. Just now the trust question is at a vexed place and we are inclined to frown upon great combinations. May they not be, when rightly supervised, but an extension of the largeness of doing things and economy of production which will still further advance our nation?

Thus this study of history leads ever to present-day problems and conditions, and helps to an intelligent outlook upon the future—just the training for our future citizens.

In answer to the original query as to the relation of geography and history, then, we find that they cannot be combined as one study. The one subject is extended in time, limited in space; the other, the reverse. Yet each subject may re-enforce the other by explaining,

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amplifying, making vivid, and fixing in mind through relation of cause and effect, for they view from different points the same facts. It is much like a trip through an unknown region by train. One may pay exclusive attention to the view from the windows on either side alone and yet gain a very imperfect idea of the country; successive trips, viewing but one side each time, will still not give a perfect idea; neither can we see everything on both sides at once. Yet we may on each trip view one side, with occasional glances at the other, so as to correlate properly the two sides and thus gain by two or three trips an accurate conception of the whole region.

The practical outcome of the whole matter is the question: how may we accomplish all this? To show in a measure how the proper associations may be made it will be well to consider briefly the stages in the development of average school children. In the period before the high school we may say that they pass through three stages, each roughly corresponding to three school years. The first is the period of self-consciousness, in which the child is learning to know himself and the outside world. At first he is able to amuse himself and a plaything is as good as a playfellow. Gradually, however, he becomes more and more interested in others and he passes into the stage of social consciousness. Now he is busy in knowing others and competing with them in games: interested to know what they are doing and to try for himself what he sees. At the third stage, that of adjustment of self in society, manhood and womanhood appear; the attempt is to fit the self into the work of others and find a place in the world; it is the time of "team-play" when the team's gain is worth the individual sacrifice: when the interest centers in seeing how other individuals and nations have fitted themselves into the order of things; harmony, adaptation, is the keystone.

In meeting the needs of children in the first stage we have done well to use history myths, birthday celebrations, stories of men and events where *action* predominates. In geography as well we are coming more and more commonly to study the home environment and to pass from that and the activities based upon it to noted and wonderful things of a similar nature throughout the world. Through these things the child is knowing himself and the outside world. He does not think the historical character so much as think himself in that one's place; he knows the hills as places for good or poor coasting. He learns to know and enjoy himself through his own and others' experiences.

The needs of the children in the second stage are met by the study of the whole earth, the regions of heat, cold, rain, etc., and the

life in those regions. This leads us, in our history, to the thought of different nations and peoples, through stories of the Greek, Roman, Jewish, English, as well as our own people. Explorers (those who were learning the outside world for the first time) in their own lives worked out what each child wishes to do at this stage; hence their lives and adventures are of deep interest. As attractive are the frontiersmen, who were living brave lives in maintaining themselves against foes animate and inanimate. In short, during this period children wish to organize their thinking of the geography and history of all parts of the world.

In the third stage, of self-adjustment, the pupil searches for suggestions throughout the outside world. His study of the nations leads him to see what each nation has done with its portion of the world; why some have increased in power, others lost; what each nation means to its colonies and to the world to-day. In geography the emphasis is on the present-day conditions as a result of evolution, of several different nations. In history, the emphasis should be upon the steps in the development of the nation,—the influence of inheritance, environment, and the effect of national reaction on each. The westward extension of successive frontiers, the development of national life, the relation of geographical factors to that development will all interest and seem a part of real life, far more than the older study of mere facts and dates.

The high school phase of this subject may be simply touched upon in passing. Geography there has assumed distinctly the scientific phase and is subdivided into physiography, meteorology, astronomy, etc. Its principles help even more in tracing the steps in the development of other nations—ancient, medieval, and modern—particular stress being given to the English; finally, a review of United States history, in the fourth year, is needed; the best preparation for American citizenship (for intelligent voting and for grasp of present-day problems) demands the careful use of the reasoning power which has developed during the high school course. Grammar school students, at best, have gained only partial power in judgment. Their best thinking and training must not be put exclusively upon Greek and Roman issues, peculiar to Greek and Roman environment of hundreds of years ago, but in part upon those which relate to successful life to-day and successful preparation for the future.

If we are able to follow these suggestions history will be something more than a dry record of the dead past; it will be part of the living present and the unknown future. Geography will be more than mere location or inanimate nature—it will be life itself. They will be mutually helpful and explanatory and both will be of vital interest to the every-day life of each individual.

SUGGESTIONS FOR COURSES IN AGRICULTURE IN THE PUBLIC HIGH SCHOOLS*

BY A. C. TRUE.

IN addition to special agricultural high schools under State or county control, it is believed that the public high schools in or near the rural communities should offer courses of instruction in agriculture. Here and there attempts are being made to teach agricultural subjects in such schools, but thus far there has been no organized effort in this direction. In order to point out the feasibility of introducing agricultural courses into the high school programmes, the committee on methods of teaching agriculture of the Association of American Agricultural Colleges and Experiment Stations, in its report to the convention of the association held at Atlanta, Ga., in October, 1892, outlined a number of high school courses in which agricultural topics were included. The following statements are taken from that report:

Agriculture has thus far been almost entirely neglected in the high school programmes, and it is high time that the friends of agricultural education should make a systematic effort to have the claims of this fundamental industry acknowledged, and satisfied in the curricula of the public high schools. Since successful agriculture is essential to the prosperity and well-being of urban as well as rural communities, there should be coöperation between country districts, villages, cities, and the States to provide the means for the maintenance of agricultural courses in the high schools. As a practical measure, it is believed that such courses may be added to those already existing in many high schools by the addition of a single teacher, who should be an agricultural college graduate, to the teaching force already supplied. The expense of maintaining this teacher and his equipment may be properly shared by the State, the village, or city maintaining the high school and the country district from which the pupils from the farms are drawn to this school. The State may properly aid this movement by offering a stated sum annually to high schools maintaining agricultural courses. Already many small townships are paying the tuition of pupils attending high schools in neighboring townships, and this system should be extended, with the proviso that such tuition fees paid for students desiring agricultural courses should be

* Reprinted from article on "Progress in Secondary Education in Agriculture," in Yearbook, Department of Agriculture, 1902.

devoted to the maintenance of agricultural courses. The balance necessary to maintain these courses will, it is believed, be cheerfully paid by the villages or cities maintaining the high schools as soon as they realize that such expenditure is in the nature of an investment. The returns from this in the way of better and more abundant agricultural products will be certain and remunerative.

In order that it may be apparent that agricultural courses may be offered in the high schools without any violent or radical reorganization of existing programmes for such schools, a number of tentative schedules for such courses are presented along with various courses already existing in high schools in different parts of the country. An examination of numerous high school programmes has revealed a very great variety in their courses as regards the number of different branches and the amount of time devoted to each branch in any particular course. In general, however, it may be said that the average high school course in this country presupposes that the student has had an eight-year course in a primary school, where he has been taught reading, writing spelling, arithmetic, elements of English grammar and composition, geography, and United States history. The best primary schools also give some instruction in drawing, music, nature study, and woodworking, or sewing and cooking. The high school course covers four years and will ordinarily embrace instruction in algebra, geometry, ancient and modern history, English, drawing and music, together with various combinations of Latin, Greek, French, German, and the elements of natural sciences (especially chemistry, physics, and botany). Whenever the manual arts or the natural sciences are largely introduced into high school courses the practical effect is to reduce the amount of time given to the ancient and modern languages. With improved instruction in English and science the effect of this on the general training of the student is not as marked as it might otherwise be, and whatever the theoretical pedagogical value of instruction in ancient or modern languages, there is little doubt that when a choice has to be made between these subjects and those which relate directly to the pursuit by which the pupil is to gain his livelihood, it will in most cases be desirable that he shall choose the things of most direct benefit in his life work. That it will not always be necessary for the student of agriculture to entirely neglect the study of at least one ancient or modern language in this high school course, provided his tastes or attainments lead him in that direction, may be seen from examination of the programmes of courses presented.

With the introduction of agriculture into the high school course

it is presumed that the courses in physics, chemistry, botany and zoölogy will be so shaped as to form an appropriate introduction to the more formal instruction in the different branches of agriculture, that is, agronomy, zoötechny dairying, rural engineering, and rural economy. As indicated in previous reports of this committee, we would include under agronomy whatever is taught regarding climate soils, fertilizers, and the botany, varieties, culture, harvesting, preservation, uses, and enemies of farm crops; under zoötechny, the theory and practice of animal production, including the breeding, feeding hygiene, and management of farm animals; under dairying, the principles and methods involved in the handling and sale of milk for consumption, and in the making of butter and cheese; under the rural engineering, principles and methods involved in the laying out of farms and the construction and use of farm buildings; systems for water supply, irrigation, drainage, sewerage, roads, and machinery; under rural economy, the history of agriculture, capital, labor systems, cost of production, marketing, records, accounts, etc., as related to farm management.

As an example of the simpler forms of high school courses, the committee printed the following programme, prepared under the direction of the State superintendent of public instruction in Indiana, and recommended it for use in that State in high schools where at least two teachers are employed exclusively in high school work, and along with this a tentative agricultural course prepared by the committee, which presupposed an additional teacher:

PROGRAMME FOR HIGH SCHOOLS IN INDIANA.

FIRST YEAR.

General Course	Weekly Recitations	Tentative Agricultural Course	Weekly Recitations
Algebra	5	English	5
English	5	Algebra	5
Latin	5	Plants and their cultivation (i. e., botany, general and economic)	5
Physics or chemistry	5	Physics	5

SECOND YEAR.

Algebra (one-third year)	5	English	5
Geometry (two-thirds year)	5	Algebra	5
English	5	Geometry	5
Latin	5	Animals and their management (i. e., zoölogy, general and economic)	5
History	5	Chemistry	5

THIRD YEAR.

General Course	Weekly Recitations	Tentative Agricultural Course	Weekly Recitations
Geometry (two-thirds year)	5	English	5
Electives (one-third year)	5	Geometry, Latin, or German	5
English	5	Agronomy (with special attention to local crops)	5
History	5	History	5

FOURTH YEAR.

Electives (*a*)	5	History	5
Zoölogy or botany	5	Political Economy	5
Latin	5	Zoötechny and dairying	5
History	5	Latin or German	5

(a) Mathematics, physical geography, oratory, or advanced physiology.

With the introduction of agriculture into high schools of this kind the division of studies among three teachers might be as follows:

A	B	C
English	Chemistry	Physics
Latin	Botany	Mathematics
German	Agriculture	History
	Zoölogy	Political Economy

Teacher B should be an agricultural college graduate and would ordinarily be a man who might be principal of the school. Teachers A and C would ordinarily be women.

The committee also published programmes illustrating high school courses in some of the larger cities. The following from the Lowell, Mass., High School shows how an agricultural course might be introduced into the curriculum of a school which gives pupils a choice between a number of different courses. Eight courses are offered, but only the three recommended as general training courses are given herewith. Studies in italics are elective.

PROGRAMME OF LOWELL, MASS., HIGH SCHOOL. (a)

FIRST YEAR.

Classical Course	Modern Language Course	Manual Training Course	Tentative Agricultural Course
English 5	English 5	English 5	English 5
Algebra 5	Latin 5	Algebra 5	Algebra 5
Latin 5	Algebra 5	Manual training 5	Plants and their cultivation (i. e., botany, general and economic) 5
Physical geography 2½	*Physical geography* 2½	*Physical geography* 2½	Physics 2½

SECOND YEAR.

Classical Course	Modern Language Course	Manual Training Course	Tentative Agricultural Course
History and English 5	History and English 5	History and English 5	History and English.....5
Geometry. 5	Physics 5	Manual training. 5	Animals and their management (i. e., zoölogy, general and economic) 5
Physics.....5	*Geometry*. 5	*Geometry*. 5	*Chemistry* 5
Latin or *French*..5	*French*. 5	*Physics*.....5	*Geometry* 5
		French. 5	French or Latin..5

THIRD YEAR.

History and English 5	History and English 5	History and English 5	History and English.....5
Arithmetic. 2½	*Arithmetic*. 2½	Manual training. 5	Astronomy and rural engineering 5
Physiology 2½	*Physiology* 2½	*Arithmetic*. 2½	*Arithmetic*. 2½
Chemistry.....2½	*Chemistry*.....2½	*Physiology* 2½	*Physiology* 2½
German 5	*German* 5	*Chemistry*.....5	*Chemistry* 5
Latin. 5	*French*. 5	*German* 5	*French* or *German* or *Latin* (*c*). 5
Astronomy and *geology*. 5	*Astronomy* and *geology* (*b*) ...5	*French*. 5	*Astronomy* and *geology*. (*b*)....5
		Astronomy and *geology* (*b*) ...5	

FOURTH YEAR.

English 5	English 5	English 5	English.....5
History. 5	*History* 5	Manual training. 5	Zoötechny and dairying 5
Chemistry.....5	*Chemistry*.....5	*History* 5	*History* 5
German 5	*German* 5	*Chemistry*.....5	*Rural economy* and *farm management* 2½
Latin. 5	*Botany*.....2½	*German* 5	Entomology ...2½
Botany.....2½		*French*. 5	*Trigonometry* and *surveying* .5
		Geometry and *trigonometry*...5	

(a) The figure opposite each study indicates the number of recitations per week.

(b) May be taken the fourth year instead of the third.

(c) Whatever language is elected should be continued through at least two years.

CONCLUSION.

Now that a real beginning of secondary education in agriculture suited to American conditions has been made and some success has been attained, there is needed a considerable number of experiments

in this direction before it will be possible to fix anything like a standard for schools of this class. One very important consideration is the nice adjustment of the culture and industrial studies so that the general education of the pupil will not be neglected while he is at the same time being trained for the successful practice of agriculture. In arranging such courses it must ever be kept in mind that as a man, citizen, and home maker the farmer needs the same training as other men. To make narrowly educated money makers in our public schools would be ruinous to the best interests of the country and mankind. All the objects of education, as defined by President Eliot of Harvard University, lately president of the National Educational Association, must, if possible, be attained by the public high schools. That is, "we must learn to see straight and clear; to compare and infer; to make an accurate record; to remember; to express our thought with precision; and to hold fast on lofty ideals."

It is believed that the introduction of effective courses in agriculture into these schools will strengthen them in all these directions if the courses are properly arranged and taught.

At present the problem of obtaining properly qualified teachers is a serious one. Most of the teachers now employed in the public high schools have been trained in literary and scientific institutions or in technical schools where no agriculture has been taught. It is only now and then that a teacher is found who is in real sympathy with agricultural education. Attention must, therefore, be directed to the fitting of teachers for this work in the agricultural colleges. Text-books on agricultural subjects, suitable for secondary schools, are almost entirely lacking. These, however, will be supplied as fast as the demand for them arises, and they will be improved as experience shows their deficiencies. The friends of agricultural education should realize that we are in the period of experiment and missionary effort in this movement. What is especially needed now is an organized propaganda through the agricultural colleges, agricultural societies, boards of agriculture, farmers' institutes, the agricultural press, and other agencies with a view to impressing on school officers and teachers and on the agricultural masses the importance and desirability of giving serious and active attention to this matter. Every successful effort to maintain an agricultural high school or an agricultural course in a public high school will add great momentum to this movement.

A great gain has been made in that there is now seen the real nature of the problems to be solved in order to secure an efficient system of secondary courses in agriculture as a part of the public school system.

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Active work along this line will now most surely bring valuable results. When the advantages to be derived from such courses in agriculture in the high schools are once clearly demonstrated in a few places it will not be difficult to persuade the taxpayers generally to contribute the necessary funds for their maintenance.

The writer went not long ago to a flourishing agricultural community, in the midst of which was a fine and wealthy city. By invitation of leading citizens he went to the splendid high school building in that city and addressed the teachers and students. In that school were gathered some 600 active and intelligent American boys and girls. They were pursuing courses in English and other languages, mathematics, history, political economy, and a number of natural sciences. With much justifiable pride the principal showed his visitor the good equipment for work in carpentry and wood carving. There was also instruction in various forms of commercial business. But agriculture and horticulture were entirely neglected. The farms and horticultural plantations surrounding that city aggregated millions of dollars in value. The prosperity, if not the very existence, of the city depended on the success of the agriculture in its vicinity. Grave evils afflicted that agricultural region, the removal of which would require much intelligence and expert skill. Hundreds of the pupils attending that high school would naturally, if not necessarily, make agriculture in that region the business of their lives. And yet no pupil of that school was learning anything about the requirements of successful agriculture or the aid which science may give the farmer in his struggle with the forces of nature vitally affecting his business. The whole drift of the education given in that school was away from the farm. Could anything be more unwise? Is it not absolutely certain that, considered merely as a matter of business policy, the taxpayers of that city could well afford to pay all the additional expense which would be required to maintain courses in agriculture in that school? Undoubtedly the farmers of the vicinity ought to share in this expense, and there is good reason to expect they would do so.

There are hundreds of American communities where a similar state of things exists. It is not a matter of interest and concern to the farmers alone. The enduring prosperity of cities is inextricably bound up with the success of agriculture. Technical education has proved a sure road to commercial development and greatly increased wealth in connection with every industry which has received its benefits. It will prove equally so as regards agriculture. The tremendously productive results which have already come from the work of the agricultural colleges and experiment stations may be multiplied a hundredfold by the education of hundreds of thousands of the flower of rural youth in secondary schools in which there is definite and systematic teaching of the technique and scientific principles of agriculture.

GEOGRAPHICAL NOTES

Value of Foreign Coins and Currencies:

A. COUNTRIES WITH FIXED CURRENCIES

The following official (United States Treasury) valuation of foreign coins does not include "rates of exchange:"

Countries	Standard	Monetary Unit	Value in U. S. Gold	Coins
Argentine Republic	Gold and Silver	Peso	$0.96,5	Gold—argentine ($4.82,4 and ½argentine; silver—peso and divisions.
Austria-Hungary (*a*)	Gold	Crown	.20,3	Gold—20 crowns ($4.05,-2 and 10 crowns.
Belgium	Gold and Silver	Franc	.19,3	Gold—10 and 20 franc pieces; silver—5 francs.
Brazil	Gold	Milreis	.54,6	Gold—5, 10, and 20 milreis; silver—½, 1, and 2 milreis.
British North America (except Newfoundland)	Gold	Dollar	1.00	
British Honduras	Gold	Dollar	1.00	
Chile	Gold	Peso	.36,5	Gold — escudo ($1.25), doubloon ($3.65), and condor ($7.30); silver—peso and divisions.
Costa Rica	Gold	Colon	.46,5	Gold—2, 5, 10, and 20 colons; silver—5, 10, 25, and 50 centisimos.
Cuba	Gold and Silver	Peso	.92,6	Gold—doubloon ($5.01,-7); silver—peso(60 cents)
Denmark	Gold	Crown	.26,8	Gold—10 and 20 crowns.
Ecuador (*b*)	Gold	Sucre	.48,7	Gold—10 sucres ($4.86,-65); silver—sucre and divisions.
Egypt	Gold	Pound (100 piasters)	4.94,3	Gold—10, 20, 50, and 100 piasters; silver—1, 2, 10 and 20 piasters
Finland	Gold	Mark	.19,3	Gold—10 and 20 marks ($1.93 and $3.85,9).
France	Gold and Silver	Franc	.19,3	Gold—5, 10, 20, 50, and 100 francs; silver—5 francs.
Germany	Gold	Mark	.23,8	Gold—5, 10, and 20 marks.
Great Britain	Gold	Pound Sterling	4.86,6½	Gold—sovereign (pound sterling) and half sovereign.
Greece	Gold and Silver	Drachma	.19,3	Gold—5, 10, 20, 50, and 100 drachmas; silver—5 drachmas.
Haiti	Gold and Silver	Gourde	.96,5	Silver—gourde.
India (*c*)	Gold	Rupee	32,4	Gold—sovereign ($4.86,-65); Silver—rupee and divisions.
Italy	Gold and Silver	Lira	.19,3	Gold—5, 10, 20, 50, and 100 lire; silver—5 lire.
Japan (*d*)	Gold	Yen	.49,8	Gold—1, 2, 5, 10, and 20 yen.
Liberia	Gold	Dollar	1.00	
Netherlands	Gold and Silver	Florin	.40,2	Gold—10 florins; silver—½, 1, and 2½ florins.
Newfoundland	Gold	Dollar	1.01,4	Gold—$2 ($2.02,7).
Peru (*e*)	Gold	Sol	.48,7	Gold — libra ($4.86,65); silver—sol and divisions.
Portugal	Gold	Milreis	1.08	Gold—1, 2, 5, and 10 milreis.
Russia (*f*)	Gold	Ruble	.51,5	Gold—imperial ($7.718) and ½ imperial ($3.80); silver—¼, ½, and 1 ruble.
Spain	Gold and Silver	Peseta	.19,3	Gold—25 pesetas; silver—5 pesetas.
Sweden and Norway	Gold	Crown	.26,8	Gold—10 and 20 crowns.
Switzerland	Gold and Silver	Franc	.19,3	Gold—5, 10, 20, 50, and 100 francs; silver—5 francs.

Countries	Standard	Monetary Unit	Value in U. S. Gold	Coins
Turkey	Gold	Piaster.	.04,4	Gold—25, 50, 100, 200, and 500 piasters.
Uruguay	Gold	Peso.	1.03,4	Gold—peso; silver—peso and divisions.
Venezuela	Gold and Silver	Bolivar.	.19,3	Gold—5, 10, 20, 50, and 100 bolivars; silver— 5 bolivars.

(*a*) The gold standard went into effect January 1, 1900 (see Commercial Relations, 1899, Vol. II., p. 7). Values are still sometimes expressed in the florin, which is worth 2 crowns.
(*b*) Gold standard adopted in November, 1900. (See *Consular Reports* No. 225, June, 1899).
(*c*) For an account of the adoption of the gold standard, see *Consular Reports* No. 238, p. 359.
(*d*) Gold standard adopted October 1, 1897. (See *Consular Reports* No. 201, p. 259).
(*e*) Gold standard adopted October 13, 1900.
(*f*) For an account of the adoption of the gold standard, see *Review of the World's Commerce*, 1896-97, p. 254.

B. COUNTRIES WITH FLUCTUATING CURRENCIES

Countries	Standard	Monetary Unit	Value in terms of the United States gold dollar on January 1, 1903
Bolivia	Silver	Boliviano	0.36,1
Central America	Silver	Peso.	0.36,1
Colombia	Silver	Peso.	0.36,1
Mexico	Silver	Dollar.	0.39,2

Potato Culture in Germany.—The cultivation of the potato on a large scale in Germany dates from the latter part of the eighteenth century, and was mainly due to the influence of Frederick the Great. Its present importance will be inferred from the fact that in the year 1901, out of 26,250,000 hectares (about 65,625,000 acres) of arable land in the German Empire, 3,300,000 hectares, or 12.5 per cent of the whole, was planted with potatoes. For every 10,000 inhabitants of the Fatherland there were planted, in 1900, 160 acres of potatoes, as against 112 acres in Austria, 98 acres in France, 31 acres in Great Britain and Ireland, and 34.8 acres in the United States. The total area and product of potato culture in Germany have ranged during recent years from 32,329,000 metric tons, grown on 7,631,975 acres, in 1896, to 48, 687,000 tons, grown on 8,297,080 acres, in 1901.

The sandy plains of northern and central Germany are by nature well adapted to potato culture, and this adaptability has been supplemented in recent years by an elaborate scheme of scientific fertilizing and cultivation, organized by the Bureau of Agriculture and continued experimentally from year to year until the whole system of planting, cultivating, and harvesting has been reduced to exact, practical methods. At the present exposition there are displayed around the gallery of the main building a collection of more than 600 samples of potatoes, grown at 28 farms and experiment stations in different parts of the empire, each of which shows by this exhibit what has been accomplished with the 15 or 16 varieties of potatoes that are now accepted as standard in Germany. Each sample includes a peck of potatoes, not selected, but taken from the run of the pile, washed, analyzed, and

labeled with the yield per hectare and the percentage of starch contained. Additional notes state the location of the fields, nature of soil, kind and quantity of fertilizer used, date of planting and harvest, etc.—a complete history of the whole process of cultivation and its results.

Through such means, the general yield per hectare has been raised by not less than 38 per cent during the past ten years. The increase in the harvested crop from 1896 to 1901 was 16,350,000 tons, valued at 400,000,000 marks ($95,200,000). Instances are reported where, by intensive cultivation under favorable conditions, 14.4 metric tons of potatoes have been grown on an acre of land, while 8 and 9 tons per acre are not unusual in practical agriculture.

As a result of these two fundamental conditions—the abundance of land adapted to potato culture and the steady increase of product through consummate scientific methods—the crop had reached in 1901 the danger point of overproduction; that is to say, the harvest of 48,687,000 tons of potatoes raised the serious problem of how to dispose of them without waste, or so depressing the market price that there would be left in it no profit for the farmer. The first result was a tremendous increase in the production of potato alcohol during the autumn and winter months, a consequent oversupply of raw spirits on the market, and the exposition of February, 1902, to illustrate, promote, and extend by all practical means the use of denaturized alcohol for technical and industrial purposes. The exposition has been repeated this year, and, as already indicated, on a broader and more comprehensive scale in that it now covers not merely the alcohol industry, but the cultivation and the several principal uses of potatoes, which may be concisely summarized as follows:

(a) *As human food.*—It is estimated that, of the entire annual potato crop of Germany, one-half is consumed directly as human food. Germans have long been in the foremost rank as potato eaters. Among a very large proportion of the laboring classes, particularly in villages and country districts, potatoes and dark bread are the principal staples of daily subsistence. For the reason that the use of potatoes as food has long been so fully developed, it is impossible to increase much by any artificial means the per capita rate of consumption, the only extension in that direction being based on the fact that the natural growth of population adds each year about 80,000 new potato eaters to the census of the empire. To this may be added the effect of recent improvements in desiccating shredded and sliced potatoes, whereby they have become a staple article of food for the German navy and army, at home and abroad, and for the colonists in Africa and Asia.

XUM

(b) *As feed for domestic animals.*—Here the potato plays a large and steadily increasing rôle in the economy of German farming and meat production. Maize is not to any extent a product of Germany; such as is used for fattening stock must be imported. In so far, therefore, as the potato can replace corn and other cereals as feed for animals, it contributes directly to reduce the sum of necessary imports. As feed for cattle, hogs, sheep and poultry, potatoes are used, both raw and steamed. But as a result of their large natural percentage of water, they deteriorate in storage and lose a large proportion of their nutritive properties after germination begins. The season of advantageous potato feeding is therefore limited to four or five months each year—from the harvest in October or November until the potato begins to sprout in the spring. This fact has given great importance to the subject of conserving potatoes by drying and other means for feeding purposes. As any practical process of preservation must operate chiefly through a reduction of the water in potato pulp, the problem has been opened to competition by a union of the Agricultural Department, the Alcohol Verein, and various agricultural societies, which offer a series of prizes amounting to 30,000 marks ($8,140) for the best potato-drying apparatus, the one condition imposed being that each machine or system admitted to the competition shall be capable of so desiccating fresh potatoes that they can be preserved in condition for stock feeding until the next year's crop can be ripened, at an operating cost not to exceed 5 cents per centner (110 pounds avoirdupois). It is stated that twenty-two contestants have entered the competition, and two of their machines are displayed as exhibits in the present exposition. As a measure of the general nature of this competition, it may be stated that one of the competing systems, the "original Rassmis dryer," manufactured at Magdeburg, is guaranteed to dry 20 tons of potatoes, beets, beet leaves, or other wet fodder in twenty-four hours. It is a vacuum evaporator which is worked with exhaust steam from a high-pressure engine, or, if that is not available, with live steam direct from a boiler. The whole subject of drying potatoes is of vital interest, since on the success of improved methods of desiccation will depend the extent to which their use as an all-the-year-round forage material can be developed.

(c) *Technical products of potatoes.*—Aside from alcohol, which forms a special category by itself, these are mainly starch, starch sirup, potato flour, dextrin, and starch sugar. In all these specialties the increase of both production and export has been rapid and steady during the past ten years. The exports of dextrin and potato flour to the

United States from three factories in the district of Berlin alone reach a total value of nearly $200,000 per annum.

An incidental advantage of this group of manufactures is that it leaves a large percentage of refuse material, which is excellent food for cattle and swine. There are not less than 300 potato-starch factories in Germany, which are distributed mainly through Silesia, Brandenburg, and Mecklenburg. The latest convenient statistics are those for the fiscal year 1897–98, when the output was 78,000 metric tons of dry starch, valued at 15,000,000 marks ($3,570,000). To this was added 7,200 tons of starch sugar and 19,000 tons of dextrin, so that the total value of the year's output of starch products was about 30,000,000 marks ($7,140,000). Incomplete statistics for the working year 1901–02 show that the product of starch sugar was 9,941 tons and of starch sirup 49,269 tons, and that the amount of potatoes consumed as raw material for starch, sirup, sugar, and dextrin was not less than 700,000 tons. The exports of such products in 1902 were 46,000 tons of dry potato starch, 10,600 tons of starch sirup and sugar, and 14,047 tons of dextrin. Great Britain is the largest purchaser of German potato starch, her imports last year being 23,827 tons, while 3,127 tons were taken by the United States and the remainder was divided between Denmark, Italy, Finland, Switzerland, and Spain.

—*Consular Reports*, May, 1903.

Products from Flaxseed and Their Uses.—The principal product derived from flaxseed by the processes of manufacture is linseed oil. The residue after the extraction of the oil constitutes the only by-product, linseed-oil cake, a valuable cattle food, which, when ground for feeding purposes, is known on the market as linseed oil meal. In the oil-making process there is practically no waste, and on an average for the entire country it is generally accepted by the crushers that a bushel of flaxseed (56 pounds) is converted by manufacture into 18¾ pounds of oil (2½ gallons), and 37½ pounds of oil cake. Out of a crop like the exceptional one of 1902 (29 million bushels) there could, therefore, be manufactured, after deducting a couple of million bushels for the next year's seeding, about 67½ million gallons of oil, and upward of 1,000 million pounds of oil cake. The actual manufacture of linseed oil in the United States, however, is subject to a somewhat rigid limitation, arising from the fact that for this product there is little foreign demand. Importing nations, as a rule, import the raw material in the shape of flaxseed and make their own oil, and the foreign demand upon the United States amounts to only about 100,000

gallons a year. The quantity of flaxseed manufactured in this country is, therefore, in the long run, practically limited to the domestic demand for linseed oil. Exactly what the demand amounts to annually it is of course impossible to determine, but, considering the fact that the principal use of this oil is for paint, there can be no doubt that, as a result of the unprecedented prosperity of recent years, the consumption of linseed oil has greatly increased. During the crop years, 1895–1896 to 1900-1901, both inclusive, it seems that the average quantity of flaxseed annually manufactured in the United States amounted to about 15 million bushels, with a resultant average annual yield of about 37½ million gallons of oil, and 558,750,000 pounds of oil cake. During these five years, it should be noted, there was successively a gradual increase in the quantities manufactured, and the continuation of this tendency in the subsequent year, together with the exceptionally heavy supply of domestic seed available for oil extraction, leads to the somewhat general opinion in the trade that the quantity of flaxseed consumed in 1901–1902 by the linseed oil mills of the United States amounted to about 20 million bushels, and that the domestic demand for linseed oil now absorbs an output of about 50 million gallons. On this basis, assuming that 2 million bushels is at present annually required for seeding purposes, the total annual consumption of the flaxseed in the United States now amounts to about 22 million bushels; hence, out of a 29-million bushel crop, a surplus of about 7 million bushels would remain for export and for reserves. In this connection it is interesting to note that exports of flaxseed from the United States in the twelve months ended December 31, 1901, amounted to 3,563,162 bushels, and for the corresponding period in 1902 to 4,046,178 bushels, the great bulk of the exports from every crop being made in the three or four months following harvest.

Of the two products derived from flaxseed, linseed oil has a sphere of economic usefulness peculiarly its own. It has no uses as an illuminant, none as a lubricant; and, although small quantities fresh from the presses are utilized, curiously enough, as a cooking grease by an element of the foreign population in some of the large cities, commercially it is valueless as an edible oil. In fact, linseed oil is adapted to none of the industrial or edible uses to which other oils are ordinarily put, whether they be vegetable, animal or mineral. But, possessing in an exceptional degree the property of absorbing oxygen upon exposure to the air, it is essentially a "drying oil"; and, compounded on the one hand with divers pigments and on the other with various gums, it finds a field of usefulness in the composition of paints

and of varnish, to the almost total exclusion of all other oils. Its monopoly of this field is so complete that it has no adulterants except those which detract greatly from its economic value, and no substitutes, excepting possibly the single competitor, corn oil. Linseed oil is also utilized to the practical exclusion of other oils in the manufacture of linoleum, oilcloth, oil silk, patent and enameled leather, and printers' ink. Probably 65 to 75 per cent of all linseed oil manufactured in the United States is compounded with pigments and gums and used as paint and varnish in the preservation and adornment of the wood and other substances that enter into manifold structural uses. The bulk of the remainder is utilized in the manufacture of linoleum and oilcloth. Among the minor uses to which this product is put, it has been stated upon good authority that probably a million gallons are consumed annually in the manufacture of printers' ink. Linseed oil is also used in the manufacture of waterproof fabrics not made of rubber, as an enamel for buttons made of wood pulp, in the manufacture of opaque window shades, for some few medicinal purposes, in the making of a soap especially valuable for washing woodwork, and for other minor purposes.

Linseed oil cake, the single by-product from the manufacture of linseed oil, is in very limited demand in the United States, but finds an extensive market abroad. This cake is used only as a cattle food, and forms one of that group of highly concentrated albuminoid or flesh-forming feeding stuffs, including cotton seed oil cake, corn oil cake, rape seed oil cake, compound and other cakes, so highly prized by European stock raisers, but little appreciated on this side of the Atlantic. To determine accurately the proportion of linseed oil cake retained in the United States for domestic consumption as compared to the proportion exported is not possible. But, assuming that 20 million bushels of flaxseed were crushed in this country in the crop year 1901-1902, the total production of linseed oil cake was about 745 million pounds; the exports for the fiscal year 1901-1902 were 582,886,775 pounds, indicating in a general way that about 78 per cent of the total output was sent abroad against only 22 per cent retained for home consumption. From the best available data obtainable for the two preceding years the proportion exported as compared to the total output shows no material difference, so that it is doubtless safe to assume that not much more than 20 per cent of the linseed oil cake manufactured in the United States is utilized as feed for domestic live stock. Almost 80 per cent of the total available supply of this valuable cattle food (exceptionally valuable from an economic point of view, both as a

fattening food and because of the high fertilizing properties of the manurial residue) is shipped abroad and converted into milk and beef upon the dairy and stock farms of northern Europe.

The principal customer of the United States for linseed oil cake is Belgium, her takings having increased from 39,021,367 pounds in 1895 to 148,263,752 pounds in 1901. Of almost equal importance is Holland, whose imports of this product from the United States have increased from a quantity less than one-half those of Belgium in 1895 to 136,728,914 pounds in 1901. These two countries combined take annually upward of 60 per cent of the total exports of linseed oil cake from this country. In the United Kingdom, third in importance as a customer for this product, the use of American linseed oil cake seems to have been to a considerable extent supplanted by cotton seed oil cake. In 1895 the English demand upon the United States for linseed oil cake amounted to 168,717,198 pounds, but since that date the demand for the linseed product has declined almost without interruption until in 1901 it amounted to only 98,368,610 pounds, while the demand for American cotton seed oil cake had increased in the same period to 312,409,282 pounds. The English people prefer for feeding purposes a cake obtaining a high percentage of oil; and to the fact that cotton seed oil cake better fulfills this requirement, and is also cheaper than linseed oil cake, is largely due this remarkable change in the character of this trade. The only other European customers for American linseed oil cake are France and Germany, whose combined takings, however, amount to only about 60 million pounds a year. From countries on this side of the Atlantic there is little demand for this product; the West Indies and Canada are practically the only importers, and their combined trade amounts to only about 10 million pounds annually. The average annual exports of linseed oil cake from the United States to all countries for the five years ended June 30, 1902, amounted to 488,891,125 pounds, and the average annual value of the trade was $5,665,392. The exceptionally heavy exports in the fiscal year 1901-1902 were valued at $7,508,133.—*Yearbook of the Department of Agriculture*, 1902.

Irrigation in India.—The most extensive system of irrigation to-day is in India, where it is calculated that at least 25 million out of a total cultivated area of 114 million acres are irrigated. The principal canals are in the Ganges and the Indus valleys, although they are found elsewhere in nearly every, if not in every province of the country. Besides the canals built under the direction of the Government, thousands of small

tanks or reservoirs are distributed throughout the Empire. The crops raised from water supplied by these tanks are estimated to support at least 20 million people, so the magnitude of these works can hardly be realized.

The snows falling on the Himalaya Mountains during the northeast monsoon furnish the reservoir from which comes much of the water used in the irrigation canals of northern India. The melting of these snows occurs during the hot months of March, April, and May, or prior to the southwest monsoon, and the water thus obtained comes just at the right time for the wheat crop.

About once in seven years great famines occur in India, notwithstanding the average rainfall is 40.6 inches, and that 90 per cent of it falls during the period from May to December. The regions most liable to droughts and their resulting famines are in those sections that have a rainfall above 20 inches.

The dry and wet seasons do not occur in different places at the same time. In the west and in the interior the wet season is during the summer, and in the southeast and east the wettest months are those of winter.

The rainfall is quite unevenly distributed, decreasing rapidly from about 115 inches near the Himalaya foothills to 6 inches in the upper Sind Province, less than 350 miles away. It is heavy near the coast line in the southern portion of the peninsula, where it ranges between 80 and 100 inches.

The greatest known rainfall in the world occurs on the southern slope of the Himalaya Mountains, about 200 miles back from the Bay of Bengal. The rainfall at an elevation of 4,455 feet averages 474 inches yearly, nearly all of which falls during the five months from May to September, and as high as 40.8 inches have been measured in a single day.

On the slope of the Western Ghats in southern India, at an altitude of 4,500 feet, the rainfall is also very heavy, and averages 261 inches yearly. East of these mountains, in the Deccan Plateau, the rainfall again diminishes to an average amount approximating 20 inches for the whole plateau, but at Haidarabad the average is 32.9 inches.—*Yearbook of Department of Agriculture*, 1902.

To Make a Map of a Certain District by Means of the Plane-table.—Experience has convinced the writer that of all instruments for determining the directions of objects the plane-table is the one best suited for school purposes. It is not much used in this country, but the

surveys of India and the United States were carried out chiefly by means of it. In its ordinary form it costs at least £3, but one suitable in every respect for schools can be obtained for less than a third of that sum, by utilizing a camera tripod as the support and pivoting on the top of it a drawing-board, say, 20″ by 15½″ (Fig. 1). Using instruments of this description, the writer got each student in two of his classes to make a map of the district shown in Fig. 4. The plane-tables were set up at Station I. and levelled (there was a little circular spirit-level sunk in each board), and then clamped. Next, drawing-paper was pinned on each board and a line in the direction of magnetic north and south drawn on it. For this purpose a part of the equipment

FIG 1.

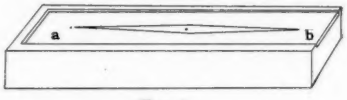

FIG 2.

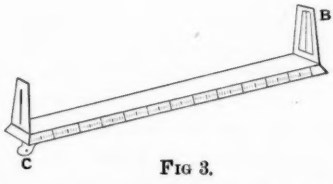

FIG 3.

consisted of a little rectangular box (Fig. 2), inside which was a compass-needle supported on an upright brass pivot. The box was covered by a strip of glass or clear mica, which could be slid into position. The instrument was placed on the paper and then turned round till the needle lay exactly between the two points *a* and *b* in the central line of the base of the box; and when this was the case the axis of the needle was parallel to the edge of the box, along which, therefore, a magnetic north and south line was ruled on the paper.

A sighting ruler was also required for each plane-table. This consisted of a ruler about a foot long, which had sights *A* and *B* (Fig. 3) hinged at each end. The ruler could be pivoted at any point of the paper by passing a pin through a small hole in a piece of metal *C*, the hole being in line with the edge of the ruler. A line could then be drawn in the direction of any object by erecting the sights and turning ruler horizontally till, on looking through a narrow vertical slit in *A*, the

object could be seen coinciding with a thin vertical piece of metal in the center of *B*. When this was the case a line was drawn along the edge of the ruler from *C* towards the object.

Having drawn lines in the directions of visible objects, we next require to represent the distances of the objects by measuring off lengths along these lines proportional to the distances. Hence there was a scale

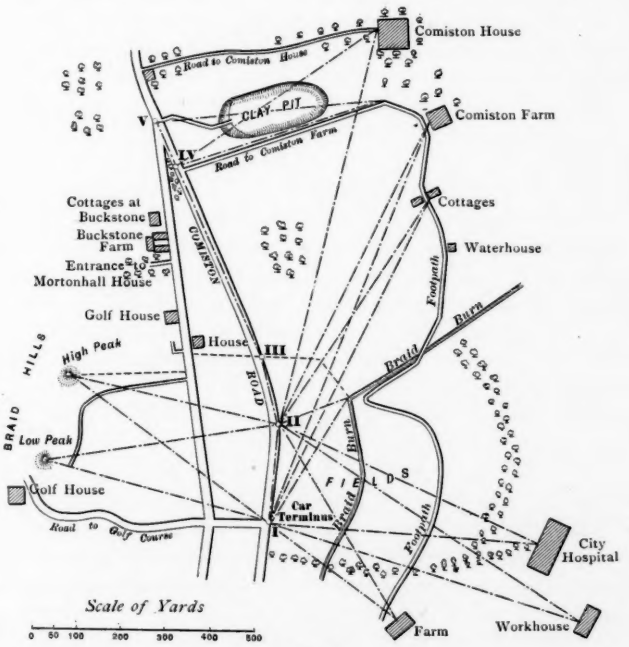

FIG 4.

marked along the bevelled edge of the ruler. The smallest divisions of the scale were one-sixteenth of an inch apart; and, taking these to represent each ten yards, the scale of the drawing was one-sixteenth of an inch for ten yards, or one inch for a hundred and sixty yards, or eleven inches to the mile—a very convenient scale when mapping a small area.

In mapping the district represented in Fig. 4 (which is a reproduction on a small scale of a drawing by one of the students) the sighting ruler was pivoted at the points marked Station I., and then the chimney of a farm, the tower of the Workhouse, the chimney of the City Hospital,

and the bend of the Braid Burn were in turn sighted on the right, and lines drawn towards them; and, on the left, lines in the direction of two peaks of the Braid Hills were similarly drawn. Also a pole erected at Station II. was sighted, and, having measured the distance from I. to II. by means of the tape-line, the corresponding distance was measured off on the paper by the scale. This fixed the position of Station II. on the map, and the slightly curved right-hand edge of the road joining the two stations was then drawn by freehand. Having determined the width of the road, the corresponding part of the left-hand edge of the road was drawn.

The plane-table was now removed to Station II., and the board levelled and got into position by pivoting the ruler at II. and laying it along the line from II. to I., and then turning the board round horizontally till a post at Station I. was sighted. The board was then clamped, and the same objects sighted as before, and lines drawn towards them. The intersections of the two sets of dotted lines fixed on the map the positions of the six objects named above. Other objects visible from II. were also sighted, and lines drawn to them, and also to Station III. Having measured off the distance from II. to III., the plane-table was removed to Station III., and the same method of procedure followed as at Station II.

In this way we went on surveying for a distance of about three-quarters of a mile along one road, and back along another—the straight one in the map—to the starting point. On the first day we did nothing more than fix the positions of the chief points on the map. At a second visit to the district we filled in the details, such as the boundaries of the fields, the course of the stream, the outlines of the woods, etc., estimating distances when necessary by means of the positions already fixed on the map.

For work of this kind one plane-table to each four pupils is sufficient, and a teacher cannot thoroughly superintend the work of more than four plane-tables or sixteen pupils. It is absolutely necessary that the teacher should make a careful preliminary survey of the district about to be mapped, in order to select the most suitable stations, measure the distances between them, and make a note of the features to be observed at each.

Experience has convinced the writer that elementary surveying or map-making such as has just been described would form a valuable piece of instruction in the higher classes in our schools, and would give the pupils a more thorough comprehension of the manner in which maps are made and surveys are conducted than they could possibly get in any other way.—*Geographical Teacher* (London), June, 1903.

EDITORIAL

GEOGRAPHY AND AGRICULTURE

THERE is an increasing demand among leaders in education and public thought that the several subjects included in the curriculum of rural schools be particularly adapted to the needs of rural communities. No subject has been more impractical in the rural schools in the past than geography. As was well stated in the *World's Work* for August, 1903, p. 3760, the geographies of the past have been primarily for the city children, and they have included little of personal interest to and capable of personal application by the rural child. The great problems of applied geography that confront the child in the country have not been touched upon. Even now our school geographies are being adapted from an urban plan for rural needs. There has not yet appeared a geography primarily for the rural schools, and written from the appropriate standpoint. Yet approximately two thirds of the people of the United States live outside of large cities.

It is appropriate therefore for the JOURNAL to give a certain amount of space to agricultural geography, for it is through agriculture that the great advances in rural education are to be made during the next two decades. No subject, except perhaps biology, is as personal to a rural child as geography. The great problems of soils, drainage, irrigation, weather and good roads that are the constant study of all advancing farmers are primarily geographical. They offer hosts of illustrations for school geography use at all stages of progress, and the school geography should be devoted to the explanation of the salient geographical points in these and other fields. It is of more value for a pupil to know the reason for a drought in his own locality than for a famine in India, and a knowledge of the possibilities of home irrigation to counteract the drought is of far greater value than a knowledge of the irrigation of Egypt or the importance of the Assuan dam.

There is no form of school in which physical geography is so valuable as in the rural school, and yet this subject is usually exploited in the cities and considered superfluous in the rural schools. The agricultural problems mentioned above may all be called applied physical geography, and they are all dictinctly rural in their use. They are but an indication of the agricultural aspect of geography, which is just being discovered and opened up.

The JOURNAL will present materials along this line of thought from time to time, and will coöperate as best it can in this great movement toward the improvement and practicalizing of rural schools, a movement that has been quietly and unostentatiously growing in the West, that is beginning to be appreciated in New England, and that is to be the great solution of education in this distinctly rural South.

REVIEWS

The Place of Industries in Elementary Education, by Katherine Elizabeth Dopp. Size, 7½x5. Pp. 208, including index. Chicago: The University of Chicago Press; London: P. S. King & Son, 1903.

Dr. Dopp states the purpose of her book to be an attempt to make clear that the serious activities of all ages bear a close relation to the attitudes of children and have the most profound significance for education in the present. She calls the book a preliminary survey, and brings to its consideration such an amount of research, both of subject matter and philosophy, that teachers will look forward with eagerness to future contributions.

The argument is most conclusive that industry has a fundamental place in the most highly organized as well as in the simplest societies, and that those societies or individuals who omit all industrial experience omit a necessary condition of normal development. Chapter II. is a consideration of the educational significance of the several stages of industrial development. Chapter III. shows that to understand attitudes we must know the activities which cause them. Chapter IV. makes practical applications in education of those activities which are significant because of their relation to natural and social environment. Chapter V. summarizes the conclusions reached.

Activities of primitive life and those of later stages are chosen as fit material for education where they correspond in physical attitude, in difficulty of technique, and in complexity of organization, to the varying problems which the child meets in his own natural and social environment. It is not suggested that more work should be added to crowded programs but that a more economical use may be made of forces already applied. At present there is undue emphasis upon passive, receptive powers, and a neglect of active, expressive forces. The most vital problem in education is how to direct emotional and lay attitudes, which now afford only physical development, in such a way as to produce impulses which have led to progress in the race.

Practical suggestions are found in the discussion of the value of constructing objects of real utility; the place of tools, technique, social entertainments and festivals; the possibility of relating activities to environment; the necessity for watching the child's spontaneous activities to get clues; the need for play and the meaning of mischief; the dependence art of and science upon industry. Under The Stage of Infancy children's toys are discussed, the harm done by emotional excitement without action, the slow differentiation between plan and work, the possibilities in an unoccupied piece of ground and in other nutritive outlets. That the foundation of a child's interests in plants, animals and topography is only with reference to his own activities, is very suggestive of the method of treating these subjects.

The Stage of Transition is the period for making the change from play to more serious activities. This can be recognized by an interest in adjusting means to an end. The child can now relate his race study to his out of door plays in such a way that he will use his own environment to work out industrial problems; and so that he will get out of it participation in the life of the people studied, and experience in sequences in industry. The value to the child of race experience is in the opportunities given to originate, himself to make devices which illustrate principles both modern and primitive. Almost any environment holds possibilities of exploitation which will prove rich in topographical ideas.

The State of Childhood is the period of retarded growth and the development of the finer muscles. Work becomes distinct from play, art in work is realized; it is the opportunity for control of technique. The transition from barbarism to civilization through the medium of constructive activities is fascinating research work to the child. Many geographical contrasts are met with, and children at this

age are ready to suggest changes if given opportunity to study the country in a graphic way.

Dr. Dopp asks for help from scientists, parents and teachers, and for coöperation among these. In elementary education there has been a failure to bring the instinctive reactions of the child into vital relationship with present social needs. Her last word is that practical activity is the child's only means of organizing the subject matter of education; that this is not a radical departure, but is more conservative than methods in common use which represent a radical departure from the path marked out by human experience. M. S. M.

Rural School Agriculture, Bulletin No. 1, St. Anthony Park, Minnesota, University of Minnesota. Price 60c., or in lots of five or more, 50c., carriage prepaid.

This bulletin is a unique attempt to place in the hands of the rural school teacher detailed plans for leading the country pupils to study the things of the farm and the farm home. It was edited by Messrs. Hays, Robertson and Wojta, but was in part written by other members of the faculty of the Minnesota Agricultural College.

It contains 237 exercises to be carried out by the pupils. Each exercise is complete in itself. It gives the object to be sought, the materials to be used, and the plan in detail which the teacher is to have the pupil carry out in doing the work of each experiment. The materials required are such as may be available at the school, or in the farm home.

The Statistical Year Book of Canada for 1902 is a paper bound volume of 729 octavo pages. The two parts into which it is divided are distinguished as "Record" and "Abstract."

The former, which comprises the first ninety-nine pages, contains a short history of the country, a sketch of its physical features, constitution and government, with notes on the area, population, lands and land regulations. Certain returns of the last census are also included in this part.

The second part, or "Abstract," contains chapters on the "agriculture," "fisheries," "minerals," "trade and commerce," "currency and banking," "railways and canals," together with a more extended analysis of "social and other statistics." A very serviceable index makes the volume easy of reference.

It is a valuable hand book to the teacher of North American geography. It can be obtained free on application to the Honorable Minister of Agriculture, Ottawa, Canada. J. A. D.

RECENT PUBLICATIONS

A Short Commercial Geography, by Lionel W. Lyde. Pp. viii, 287. London: Adam & Charles Black, 1903.

A short useful summary of the Commercial geography of the world, written in the concise graphic style peculiar to the author. To be reviewed later.

California Geographical Handbook for Teachers and Pupils, compiled by Hare Wagner. Pp. 53. San Francisco: The Whitaker-Ray Company, 1903.

A brief handbook giving the salient facts concerning the geography of California, with suggestions for review, and containing an interesting chapter on the meaning of geographical names in California.

Historic Highways, Vol. 6. Boone's Wilderness Road, by Archer B. Hulbert. Pp. 207. Cleveland, Ohio: Arthur H. Clark Co., 1903.

An interesting account of the history and significance of the great highway of migration explored by Daniel Boone. Valuable in history teaching more than in geography.

XUM

A Geography of Commerce for Academies, High Schools and Business Colleges, by John N. Tilden and Albert Clarke. Pp. 145. Boston: Benj. H. Sanborn & Company, 1903.

An authoritative geography of commerce, whose scope is indicated in the title. The book is written primarily to show details of the export and import commerce of the United States, contains a great amount of facts and is illustrated by eleven very good colored maps. Should be used with a descriptive geography. Statistics are up to date. Book is valuable as a reference book for all teachers.

The Log of a Cowboy, by Andy Adams. Pp. 387. Boston: Houghton, Mifflin & Co., 1903.

An interesting narrative account of cattle trailing in the plains twenty years ago. Inviting reading. Some good educational ideas are included as the following extract will indicate: "Another thing about those people back in those old States: Not one in ten, I'll gamble, knows the teacher he sends his children to school to. But when he has a promising colt to be shod, the owner goes to the blacksmith shop himself, and he and the smith will sit on the back sill of the shop and they will discuss how to shoe that filly."

The Fourth Annual Report of the Geographic Board of Canada (1902) can be procured at the nominal price of five cents by addressing the Deputy Minister of Marine and Fisheries, Ottawa, Canada.

It is a smaller report than usual, and embraces only those names approved by the Board from the 1st July, 1901, to the 30th June, 1902. Upwards of one thousand names have been approved during that time and are recorded in this report.

NEWS NOTES

Latest phase of Mont Pélée.—Mont Pélée in the Island of Martinique has been constantly full of interest since its first outbreak of violence in May, 1902. Its latest phase is particularly interesting because it presents a feature hitherto unknown in volcanoes. The lava which is now emerging from the volcano solidifies before it leaves the crater and is being pushed from below, so that it is rising constantly above the crater as a cork might rise above a bottle. Thus an obelisk of lava, more than eight hundred feet high, and with its base more than three hundred feet thick, has been found rising conspicuously above the top of Mont Pélée.

Mt. McKinley.—Recent word has come of the successful progress of an expedition which is now in Alaska with a view of climbing Mt. McKinley, the loftiest peak in North America. This peak was climbed to the snow line last year by Alfred H. Brooks of the United States Geological Survey, who was the first to reach the base of the mountain.

New accession to Belgium.—The daily papers report the recent merging of Altenburg with Belgium. Altenburg was a small neutral district lying between Holland, Belgium and Prussia, and claimed by Belgium and Prussia. Belgium has now bought up the claims of Prussia, inasmuch as the area, not more than one and a half square miles, was being made a great rival to the world-famous gambling center of Monte Carlo.

DIFFERENT SYSTEMS OF TEACHING GEOGRAPHY MAY PRODUCE EQUALLY GOOD RESULTS. IN RUDYARD KIPLING'S WORDS, IF "TRIBAL LAYS" MAY BE ALLOWED TO STAND FOR "SYSTEMS OF TEACHING GEOGRAPHY"—

> "There are nine-and-sixty ways
> Of constructing tribal lays,
> And every single one of them
> is right."

THE FIRST ESSENTIAL IS THAT THE TEACHER SHOULD BE HIMSELF SUFFICIENTLY INSTRUCTED IN GEOGRAPHY, AND CONVERSANT WITH ITS PRINCIPLES, TO BE ABLE TO PRESENT IT IN THE WAY HIS OWN EXPERIENCES SHOW HIM TO BE THE BEST. —Hugh Robert Mill

FIG. 11. *Looking up at Mount McKinley.* (*See page 462.*)